

SOME SOUTH INDIAN COCCIDS OF ECONOMIC IMPORTANCE. (a)

BY

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The economic importance of Coccidæ (scale insects and mealy bugs) needs no special mention—especially in tropical countries. Though this is well known in tropical America, Australia and South Africa, the fact is not so well realised in India. The causes that contribute to this paucity of our knowledge regarding this group of insects are many. In the first place these insects have a partiality for fruit trees, garden shrubs, and hot house plants, and in India there is hardly anything compared to the extensive fruit cultivation and horticulture found in those countries. Except on the hill ranges where some attempt is nowadays being made to grow fruits, and around some big cities where nursery men ply their trade, there is nothing worth the name of fruit culture anywhere in the plains; this is specially the case in South India. Secondly, though several species of Coccids are found in India, except in a few cases damage to the ordinary cultivated crops by these insects is very little, compared to others like beetles and caterpillars with which agriculturists are more familiar.

But nowadays, however, there is a tendency and desire on the part of both European settlers and Indian landlords in different parts of India to take to gardening and fruit culture in addition to the time-honoured custom of growing only the staple food and industrial crops. To these prospective gardeners and orchardists a knowledge of the Coccids of the country—especially of those forms which are of some economic importance—will, I believe, be of some use and it is chiefly with this idea of contributing a little in this direction that this paper is read.

In the course of a systematic study of the species of this interesting group of insects found in South India, I have had chances of noting some forms which, judging from their present status, bid fair to play some prominent part as insects of economic importance in course of time. At present most of the species are found confined to various wild trees and shrubs, and some of the well-known fruit pests of the group so far known in the country have not as yet spread sufficiently to attract any serious attention.

(a). This is a paper which was read at the Indian Science Congress, Lahore, in January 1918.

But as the area under fruit is increasing gradually and forests are cleared for cultivation, several of these forms might, under favourable circumstances, transfer their activities not only to fruit trees and garden plants but even to food and industrial crops grown in the fields. Nor do the chances for wider distribution stop there; nursery men and fruit vendors have begun to import fruit and nursery stock from foreign countries and this will be another important medium for the importation of some of the well-known scale pests from abroad. In this manner Coccids have good opportunities of coming into more prominence in the future.

I have in this paper attempted to list those forms which have so far been noted to be of some economic importance and a few which show promise of playing the role of pests in due course. So far I have noted about 129 species of Coccids inhabiting South India and of these I have selected the following 33 which are of economic importance and therefore deserve some attention.

FAMILY—COCCIDÆ.

Sub-family—DIASPINÆ.

1. *Chionaspis vitis*, Green.\*

Found on Mango in Bangalore, Coimbatore and at the foot of the Nilgiris. The female scales are white and more or less transparent and oval in shape, the male puparia are small and snowy white. The insect is found in colonies on the foliage and infested leaves turn into a pale sickly yellowish colour. It is not at present a very serious pest but it is not unlikely to be so. The alternate food plants on which this insect has been noted are *Vitis lanceolaria*, *Elaeagnus latifolia* and occasionally *Loranthus*. Mr. Green who has studied the insect in Ceylon says "should the grape vine be ever cultivated largely in Ceylon, this insect might prove a rather serious pest." The remark applies equally to South India.

2. *Diaspis echinocacti*—Bouche.\*

This is the prickly pear scale. Found in Coimbatore and other localities. The small pale whitish brown oval scales are found in patches on the prickly pear. The colonies are especially numerous near the branches of thorns and flower buds. During the summer months the insect multiplies enormously and considerably checks the vigorous growth of this undesirable weed, but it has not begun to play a very important role as a natural enemy of the prickly pear.

3. *Hemichionaspis aspidistra*, Sign.\*

This insect has been noted on a variety of plants till now. On pepper leaves and berries in Malabar, on Ceara rubber leaves on the Nilgiris, on Citrus leaves in Godavari, on Jak leaves in Mysore, on Ficus leaves in Coimbatore and Coconut leaves in Malabar. The female puparium has an irregular elongated shape pointed at one end and more or less dilated at the posterior end. Has a pale brown colour. The male puparia are small, narrow, and clear white in colour. It is curious that in certain cases males predominate and in others only female scales are found.

\* NOTE.—All the species with an asterisk were named by Mr. E. E. Green.

This insect is important from an economic point of view as it has been noted on a variety of plants in different places and in some causing an appreciable amount of damage. Has been noted to cause severe damage to young arecapalms.

4. *Hemichionaspis thea*, Mask.\*

This insect resembles '*H. aspidistræ*' very closely. The male scales are arranged on the leaves in definite groups and are often found far more numerous than the female scales. Found on pomegranate leaves—Coimbatore and Tea in Assam. In Assam it is often found to be serious especially on young tea bushes. It is likely that the insect is present in the tea districts of South India also.

5. *Aspidiotus destructor*, Sign.\*

Found on cocoanut leaves all along the West Coast, in Tinnevely and in Coimbatore. The transparent yellowish white oval scales are found in large patches on fronds that are badly infested. In some places some appreciable damage is done by this insect. The effect of the infestation consists in the leaves getting faded and shrivelled up and the colour turns to a sickly pale yellowish white. The insect has also been noted on pepper, Para rubber, *Loranthus*, etc.

6. *Aspidiotus camellie*, Sign.\*

This is the well known 'yellow bark louse' of tea. The scales are oval and have a pale yellow colour; they resemble small oyster shells overlapping one another. Noted on elm in Ootacamund. Also recorded on *Grevillea*, *Cinchona*, and *Michelia* in Ceylon. This is often a bad pest of young tea on the Nilgiris; in these cases the upper shoots are covered over by the scales and killed outright. The scales can be easily made out on infested plants due to their conspicuous appearance.

7. *Aspidiotus (Chrysomphalus) aurantii*, Mask.\*

This is the *citrus* red scale of American states, but it has not yet become so serious a pest in India. Has been found on Rose bushes, Malabar, and on Jasmine leaves, Godavari District. I have not yet found it on *citrus* in South India. It has been recorded on Agave, Pomelo and Orange plants in Ceylon. This is evidently one of those insects regarding which orange cultivators may be warned. On rose bushes it is found very bad, killing shoots, stem and leaves of infested plants. The circular greyish brown transparent scales cover the shoots and foliage in masses.

8. *Aspidiotus ficus*, Ashmead.\*

This is another well known insect and has an equally wide distribution. The small more or less conical purplish scales are often found crowded together on citrus leaves. Noted on Ficus in Anantapur Mango in Coimbatore, Citrus in Malabar and Nilgiris and on Pandanus in Cochin. This has not been found to be so bad as '*A. aurantii*.'

9. *Mytilaspis piperis*, Green.\*

This is the only species of the genus of mussel scales that has been found to be a pest so far. It is noted on black pepper infesting the tender vines and the foliage in North Malabar and Wynaad. In some plantations in Wynaad and Travancore severe damage has been recorded. An infested vine cannot easily be made out as the colour and general appearance of the scales resemble the corrugated surface of the vine.

## Sub-family—LECANIINÆ.

10. *Pulvinaria psidii*, Mask.\*

This is one of the most important of Coccid pests at present known in South India. It is popularly known as the 'Guava mealy scale.' Though it is very often found bad on the guava plant it has been noted to do damage to a variety of others, the chief of them being coffee, tea, mango, *Citrus* and *Morinda*. The young and fairly mature scales are bright green in colour more or less resembling the green bug of coffee, but the mature female throws out a white ovisac and this is found in numbers on badly infested plants. A black mould also forms in course of time and gives a completely blighted appearance to the plants affected. It is found throughout South India especially in the hill plantations.

11. *Pulvinaria maxima*, Green.\*

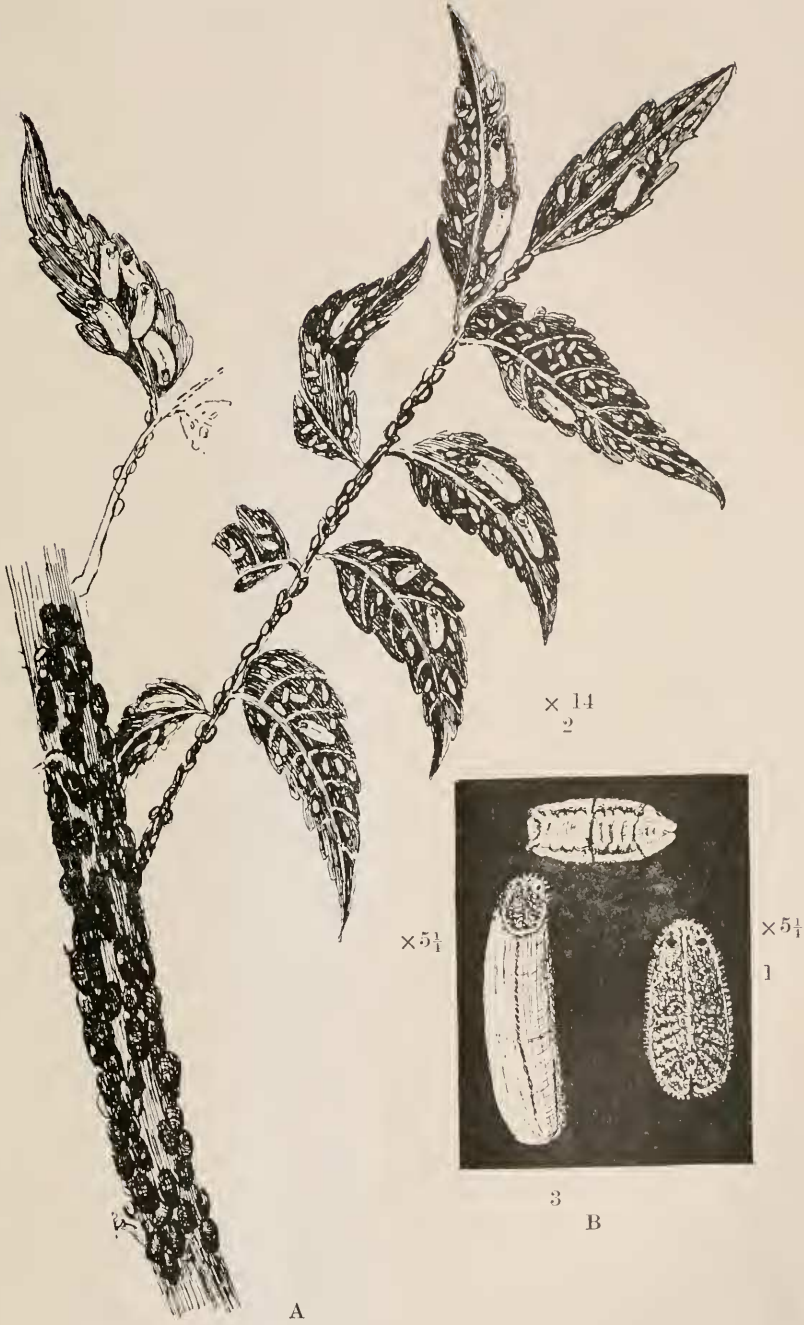
This is also a destructive species almost chiefly confined to the Margossa (nim) tree and found in most parts of South India chiefly in and around Coimbatore. Almost throughout the year the pest can be found on trees in varying numbers. A badly infested tree shows all the stages of the pest in numbers; the male puparia are small and white and cover the whole surface of the plant, leaves, shoots and stem. The adult females are pale brown leathery objects generally found attached to the tender shoots and stems; when about to oviposit they spread themselves to the leaves and branches and deposit the long curved ovisac so conspicuously seen on infested plants. The adult males are tiny delicate two winged creatures with a pair of long processes at the tail end. A small lady bird beetle is also found predacious on this scale. The common black ant '*Camponotus compressa*' visits the scale in colonies, and nests of this ant are found underneath these trees. The insects throw out so much secretion that the ground below becomes completely wet and the foliage of the lower branches becomes covered with black soot giving the characteristic blighted look. There is every likelihood of this insect spreading to other plants and trees also. Recently mulberry plants were found attacked in Coimbatore. The insect was first described by Green from Javanese specimens collected on *Brythrina lithosperma*.

12. *Pulvinaria thespesia*, Green.\*

This species is in structure and habits very similar to the preceding species. I have noted this pretty bad on the Portia tree (*Thespesia populnea*) which is a very common avenue tree along the coast roads of the Godaveri district near Cocanada, Coringa, etc. The long, curved ovisacs are very big and prominent and found in masses on the leaves and shoots. This was first described from Ceylon on the same plant and has not been recorded from India till now.

13. *Creoplastes actiniformis*, Green.\*

This pretty looking reddish brown waxy scale is found on a number of plants and though it has not yet assumed the role of a pest there are signs that it might prove a destructive species. Found on Cocoanut leaves (Coimbatore and Malabar), Mango leaves (Coimbatore), on Canna leaves (Samalkota, Godavari), on *Ficus* (Anantapur) and on *Calophyllum* leaves (South Canara). The scale is often found in large colonies along the unfolded inner surface of the cocoanut leaves in Malabar. On *Calophyllum* it was found doing some appreciable damage. The octagonal arrangement



PULVINARIA MAXIMA, Gr.

A.—Scale infested branch of Nim.

B.—1. ♀ adult. 2 ♂ puparium. 3. ♀ with ovisac.



of the spherical waxy test into plates gives this insect an ornamental appearance. It is recorded on *Loranthus* in Poona.

14. *Ceroplastodes cajani*, Mark.\*

Found on Red gram all over South India. It is also found doing some damage to the main vines of '*Dolichos lablab*,' to shoots of *Zizyphus jujuba* and the sacred 'thulsi' plant (*Ocimum sanctum*). The scales are small and oval and covered with white glassy tests of wax. Big patches of these are found on Red gram and lablab stems. A species of '*Eublemma*' moth is found predacious on this insect. This insect was first described by Maskell under the name of '*Eriochiton cajani*,' from specimens collected at Madras on Red gram in 1891.

15. *Lecanium nigrum*, Neit.\*

This is popularly known as 'the black scale' and has a world-wide distribution. The scales are of a dark shining brown colour and have an irregularly oval shape with the dorsal surface strongly convex. The scales cover the shoots and leaves in numbers. In Coimbatore it has been noted on Cotton, *Thespesia populnea*, *Hygrophila spinosa*, Sandalwood, garden crotons, and *Hibiscus esculentus*. Sometimes it does considerable damage. Some of the *Thespesia*, avenue trees in parts of Mysore are bad with this pest. Besides the above it has been noted on coffee, tea, rubber, etc., in different parts of India. It is badly parasitised by a chalcid very often.

16. *Lecanium hemisphaericum*, Targ.\*

This is one of the two or three well known Coccid pests of South India—'the brown bug of coffee' and has been noted throughout the world on various food plants. Sometimes it is very bad on coffee in the hill plantations. It also infests tea, guava, cinchona and other plants. The scales are oval and hemispherical and have generally a reddish brown colour.

17. *Lecanium oleae*, Bern.\*

A very convex purple brown scale with prominent ridges on the surface. This is not so common as the two previously mentioned species of '*Lecanium*.' It is found on Tamarind fruits and stalks and on *Hygrophila spinosa* (Coimbatore), on coffee (Coorg), and on *Sesbania* and *Thespesia* (in the Bellary District). This is the common 'olive scale' of European countries.

18. *Lecanium viride*, Green.\*

Among coccid pests so far known in South India this insect appears to be one of very great importance as a pest. It is popularly known as the 'green bug' of coffee and tea in the hill plantations of South India and a good deal is on record regarding this insect. Besides coffee and tea which it regularly infests it has been noted on *Aegle* and *Carissa* (Coimbatore) and Guava, Citrus and *Flumeria acutifolia* on the Nilgiris. It is often found together with the 'brown scale.'

19. *Hemilecanium imbricans*, Green.\*

This scale is of a fairly big size about  $\frac{1}{2}$ " across and has a rough circular shape. The dorsum is slightly convex. In colour the scale is dirty brown and in many cases very closely resembles the stem of the host plant. Noted on '*Jatropha multifida*' and *Ailanthus excelsa* (Coimbatore) and Cedar (Shevaroyis). It has been noted before on *Ficus* sp. and Red cedar in Mysore; on these trees it is a pretty bad pest. Masses of the scale

and its young are found completely covering the stem and shoots of the host plant and this gives a glistening white appearance to the stem. A black mould follows the attack and the tree suffers to an appreciable degree. It is probable that this insect might in course of time assume the status of an important pest of some of our valuable trees.

Sub-family—DACTYLOPIINÆ.

20. *Dactylopius indicus*, Green\*.

This is the well known wild cochineal insect producing the beautiful purple dye. Though this is not commonly found I found it pretty abundant on the prickly pear plant in parts of the Godavari district. The soft mealy covered females are found crowded together on the surface of the prickly pear foliage, and the male puparia which are shining white small cocoon shaped objects are also found clustered near the thorn bunches. The insect seems to effectively destroy prickly pear of the species *Opuntia monacantha* though my efforts to inoculate the same on the common South Indian species '*O. dileni*' did not meet with success. The dye got out of this insect is a brilliant purple one.

21. *Pseudococcus citri*, Risso.

A well known mealy bug found throughout the world and doing serious damage to different plants in various countries. It has over forty host plants. I found it bad on Cocoa plants grown in the Government gardens, Kallar (Nilgiris). Large white patches of this bug were found covering the growing pods. It has been noted before on Coffee seedlings in Mysore and Coorg.

22. *Pseudococcus virgatus*\*.

This is another mealy bug very commonly found in South India infesting a variety of garden plants such as croton, tomato, *Sesbania*, *Hibiscus* (in Coimbatore), Cambodia cotton (in South Arcot), etc.

23. *Pseudococcus sacchari*, Ckll. †

This mealy bug is found infesting the inner surface of the leaf sheaths of the growing paddy plant. Sometimes this does considerable damage to paddy in parts of Trichinopoly and Tanjore. It is known as the 'choorai' disease on paddy. Infested fields show isolated patches of plants drying up.

24. *Pseudococcus corymbatus*, Green. (MS name only).\*

This is another destructive mealy bug which produces large masses of white mealy matter. Noted on Jak (in Malabar), On citrus shoots and fruits (in Godavari District), and on Cotton plants (Coimbatore). The shoots and fruits of the host plants are covered over with thick masses of the white mealy matter under which the bugs live. In Malabar the red ant *Oecophylla* visits the colonies of the bug on Jak. Not recorded before from India and no description of the species has yet been published.

25. *Phenacoccus insolitus*, Green.\*

A mealy bug found doing damage to Brinjal plants all over South India. Generally found appearing on plants which are fairly old and have been in the field for a pretty long time. Attacked plants show the leaves covered

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† Named by Prof. Newstead.